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FIRST QUANTUM
MINERALS LTD.

Cobre Panamá

Maintenance Work Order / Orden de Trabajo de Mantenimiento			
Work Order No. / No. Orden Trabajo	1059775 WM	Original Copy	
Start Date / Fecha Inicio	12/04/23	Priority / Prioridad	5
Counter Reading / Lectura Medidor		WO Type / Tipo Orden	PM Orders
Category Code / Código Categoría	-. 068-Pump -. Work Order Reference Equipment SD / Island OP	Status / Estado	WO Issued & Released
		Supervisor	Proc Flotation Cu Supvsr

Asset General Information. / Información General Activo	
Asset No. / No. Activo	332-PP-9024
Manufacturer / Fabricante	GIW
Model Desc. / Desc. Modelo	Pump 04 Rougher Tails Copper Rougher Flot
P&ID	P&ID
Parent / Padre	332-PP-9000 Pumps Copper Flotatn Roughers
Warranty / Garantia	NO

Description of problem in Work Request. / Descripción del Problema	
1.	26W Inspect Pump Wet End

Work Order Parts / Lista de Partes			
JDE Number / Número JDE	Spare Description / Descripción de la Parte	Op No./No.02	Qty / Cant. Unit / Unidad
5010084	SEAL KIT COUPLING GIW 05073406		1.000 EA
5010090	SEAL KIT RING CONMET 10036552		1.000 EA
5287774	GREASE COPAL OGL 18KG		1.000 EA
5007998	PACKING GLAND GIW 02526957		1.000 EA
5289313	PACKING GLAND BURGMANN		1.000 BX

Equipment and Instructions / Equipo e Instrucciones	
	26W Replace Wear Plate Liner
	26W Inspect Pump Wet End
	13W Rotate Plate & Insp Cpling

Tooling / Herramientas			
JDE Number / Número JDE	Spare Description / Descripción de la Parte	Qty / Cant.	Unit / Unidad

Labor Allocated / Descripción Mano Obra			
Crew Size / No. Personas	Work Center / Centro de Trabajo	OPS / Sec. Op	Est. Hours / Horas Est.
3	LCOP 26W Inspect Pump Wet End	10.00	48.00
2	LINT 26W Inspect Pump Wet End	10.00	32.00

Timesheet / Hoja de Tiempo			
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Supervisor Name / Nombre Supervisor:

Supervisor Signature / Firma Supervisor:

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Maintenance Work Order / Orden de Trabajo de Mantenimiento			
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Category Code / Código Categoría	-. 068-Pump	Status / Estado	WO Issued & Released
	-. Work Order Reference Equipment SD / Island OP	Supervisor	Proc Flotation Cu Supvrs

Employee JDE Code / Código JDE Empleado	Name / Nombre	Initial / Iniciales	OPS / Sec. Op	Act. Hours /H. Actual
45202	M. Zamora +4 12-04-23	✓		14
45202	M. Zamora 13-04-23	✓		14
49099	Christian Espino 12/4/23			11

Complete values / Completa estos valores:	
Actual Start Date of Job / Fecha Real de Inicio de Trabajo	12-4-23
Actual Start Time of Job / Hora Real de Inicio de Trabajo	12:00 pm
Actual Finish Date of Job / Fecha Real de Terminación de Trabajo	13-4-23
Actual Finish Time of Job / Hora Real de Terminación de Trabajo	3:00 pm

Failure / Falla	
Analysis / Análisis	
Solution / Solución	

Comments / Comentarios
Rotate Wear Plate rotation Inspect Coupling Disassemble Volute and Inspect Wet End

Supervisor Name / Nombre Supervisor:

Supervisor Signature / Firma Supervisor:

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WO Raised by: / Orden Creada por:	MINERA PANAMA S.A.
WO Raised Date: / Fecha Creacion Orden:	28/02/2023
Work Completed by: / Trabajo Completado por:	
Supervisor Review: / Revision del Supervisor:	
Date Completed / Fecha completada:	

Supervisor Name / Nombre Supervisor:

Supervisor Signature / Firma Supervisor:

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TASK / TAREA	26W Inspect Tails Pumps Wear components.	180D332M998_04
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PURPOSE / PROPOSITO:	<i>To Safely carry out the Mechanical requirements of the Process Plant in a systematic and orderly manner.</i>
SCOPE / ALCANCE:	<i>This work instruction is part of an approved maintenance strategy that has been developed to maintain the plant reliability. horizontal Pump is carry out to Mechanical Inspect the performance to sustain the efficiency of the plant operation.</i>

PREREQUISITES / PRE-REQUISITOS			
People Required / Personal Requerido	PPE / EPP	Tools & Equipment / Herramientas y Equipos	Competency / Competencia
02 Industrial Technician	Standard PPE/Epp estandar	Pieces Of Rags / Trapo Industrial	Trained in the task to perform the procedure
01 Operator	Gloves/Guantes	Coupling grase, Copal.	Personal entrenado para la tarea
01 Common tech	Ear Plugs/Tapones de oido	Mechanical Tool Kit/ kit de herramientas Mecánicas	
	Follow JSEA PPE stated for each task	Coupling lacer aligner	

WARNING! / PELIGRO	
<i>Most equipment will be operating, be aware of the inherent dangers, i.e. no loose clothing, wear gloves where appropriate. Some of these checks include touching equipment to feel for vibration, if it is not safe to do so, DO NOT DO IT.</i> La mayoría de los equipos están en operación, tener precaución de los peligros inherentes, etc. ropa suelta, utilizar lentes de seguridad apropiados. Algunos de estos chequeos incluyen tocar equipos para sentir vibración, si no es seguro hacer esto, NO LO HAGA.	

PM CONDITION CODES / CODIGOS CONDICION DEL PM		
1	Poor Condition / Condicion Pobre	<i>Needs Urgent Attention / Necesita atencion Urgente</i>
2	Average Condition / Condicion Promedio	<i>May Require Attention / Podria Requerir Atencion</i>
3	Serviceable Condition / Condicion operativa	<i>Requires No Attention / No Requiere atencion</i>

APPROVAL CONTROLLED DETAIL.	DOCUMENT STATUS:			
PREPARED BY: Jhonatan Lorenzo	REVISION	1	ISSUE DATE:	16/10/2019
APPROVED BY:	REVIEW DATE:			
APPROVER'S SIGNATURE:	DOCUMENT NAME: 26W Inspect Tails Pumps Wear components.			

PREPARATION ACTIVITIES / ACTIVIDADES PREVIAS

- ☐ Team group discussion (5 minutes-on hazards). / Charla grupal (5 minutos –riesgos y peligros)
- ☐ Prepare the lock out and tag out / Prepare el bloqueo y etiquetado
- ☐ Perform the field risk analysis / Realizar un análisis de riesgo de campo.

DETAILED INSTRUCTIONS

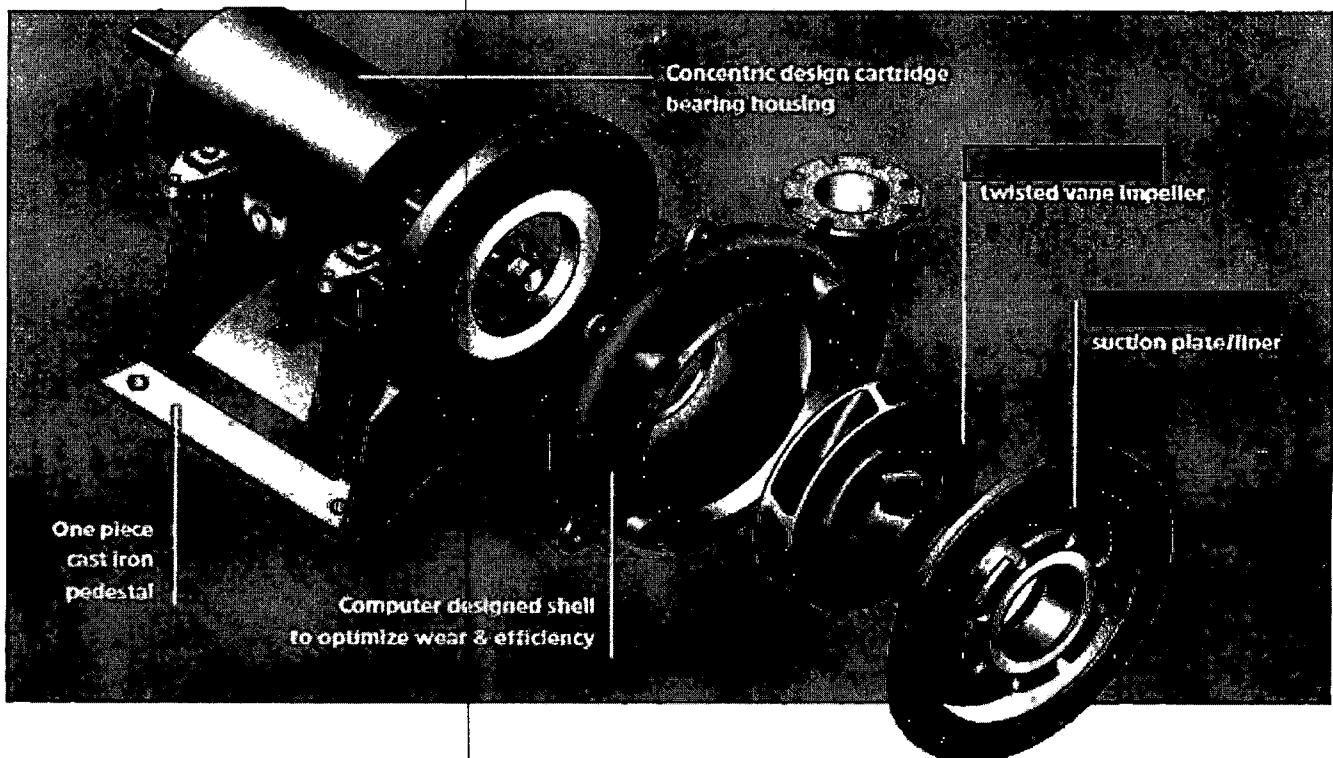
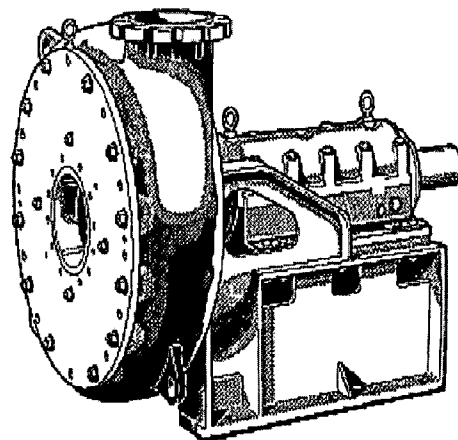
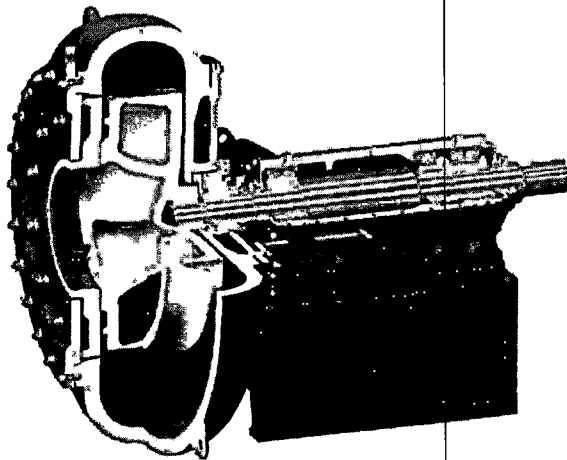
<u>INSRUCTIONS</u>		DONE
Wet End Inspection and wear plate liner replacement		
1	Fill safety documents as risk assessments and LOTO documentation.	
2	Lock on the equipment you will work with.	
3	After the LOTO is apply ask the operator to start the equipment if it start review the LOTO if it doesn't you can start to carry out the tasks .	
4	Remove the suction spool .	
5	Remove the discharge spool .	
6	Remove wear plate	
7	Remove the Volute	
8	Inspect the volute, impeller & Hub liner to see any internal wear.	
9	Inspect the discharge and suction spool to see if the rubber liner is in good condition	
10	Re-Install the volute	
11	Before Re- install Wear plate rotate it 180 degree clockwise	
13	Torque bolts	
14	Install suction spool	
15	Install discharge spool	
16	Replace Gland water packing	
Coupling Transmission Inspection		
17	Remove high speed guard	
18	Open HS coupling	
19	Clean the coupling and see any wear at the teeth	
20	Inspect Gaskets	
21	Re-grease the HS coupling	
22	Close HS coupling	
23	Remove low speed guard	
24	Open LS coupling	
25	Clean the LS coupling and see any wear at the teeth	

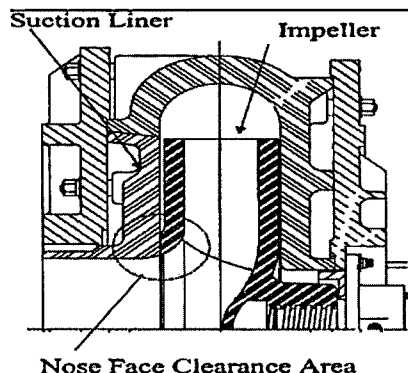
26	Inspect gaskets		
27	Re-grease the LS coupling		
28	Close LS coupling		
29	Verify alignment of LS Coupling		
30	Verify alignment of HS Coupling		
31	Install guard HS Coupling		
32	Install guards LS Coupling		

Note 1: If the task doesn't apply for the equipment fill the grill with "N/A."

Note 2: If a defect is found write the defect at the defect sheet and notify the supervisor to rise a work request.

Wet End Picture





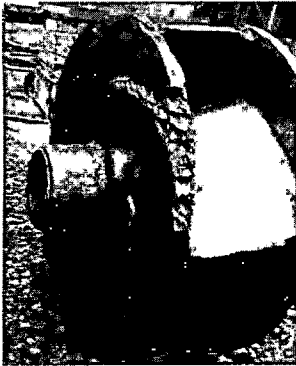
Torque chart

Torque for Grade 8 UNC Hold Down Bolts New standard, Jan 2003 (Recommended for replacement and rebuilds)						
Bolt Thread		Wrench Size		Torque in FtLb		Nominal Shaft Size
Diameter	Pitch	Bolt	Hvy Hex Nut	Anti-Seize	Oiled	
3/4	10	1 1/8	1 1/4	225	280	2 7/16, 2 15/16, 3 15/16
1	8	1 1/2	1 5/8	550	680	4 7/16, 5 7/16, 6 7/16, 7 3/16
1 1/8	7	1 11/16	1 13/16	800	960	4 7/16, 5 7/16, 6 7/16, 7 3/16
1 1/4	7	1 7/8	2	1150	1360	4 7/16, 5 7/16, 6 7/16, 7 3/16
1 1/2	6	2 1/4	2 3/8	1900	2660	9
1 3/4	5	2 5/8	2 3/4	3000	4600	10 1/4
2	4.5	3	3 1/8	4500	6500	10 1/4 11 1/2

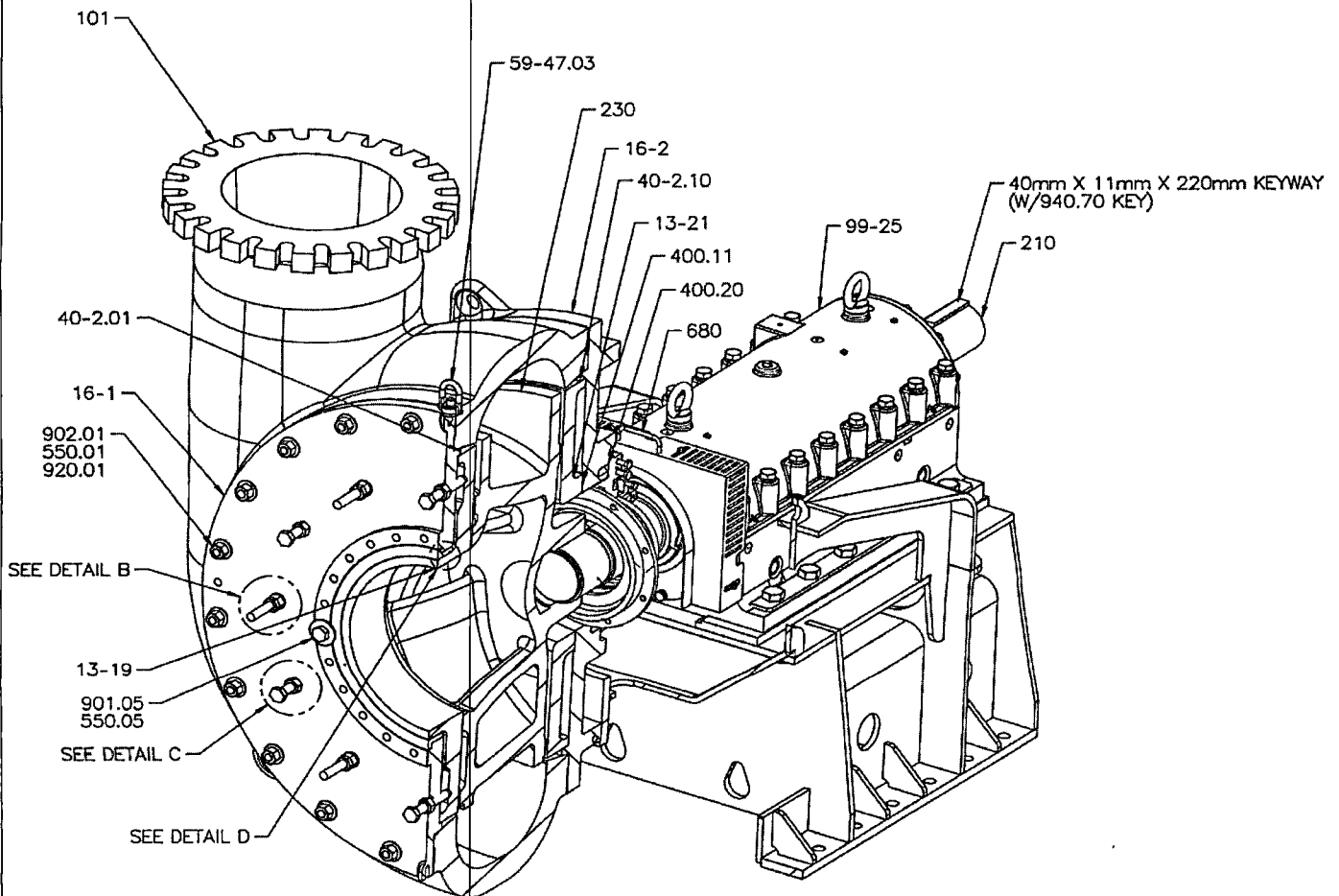
Torque for Grade 5 UNC Hold Down Bolts – Reference Only (Originally supplied before 2003 as standard)						
Bolt Thread		Wrench Size		Torque in FtLb		Nominal Shaft Size
Diameter	Pitch	Bolt	Hvy Hex Nut	Anti-Seize	Oiled	
3/4	10	1 1/8	1 1/4	160	170	2 7/16, 2 15/16, 3 15/16
1	8	1 1/2	1 5/8	390	405	4 7/16, 5 7/16, 6 7/16, 7 3/16
1 1/2	6	2 1/4	2 3/8	1150	1220	9



Middle use wear plate liner, should be rotate it to get uniform wear

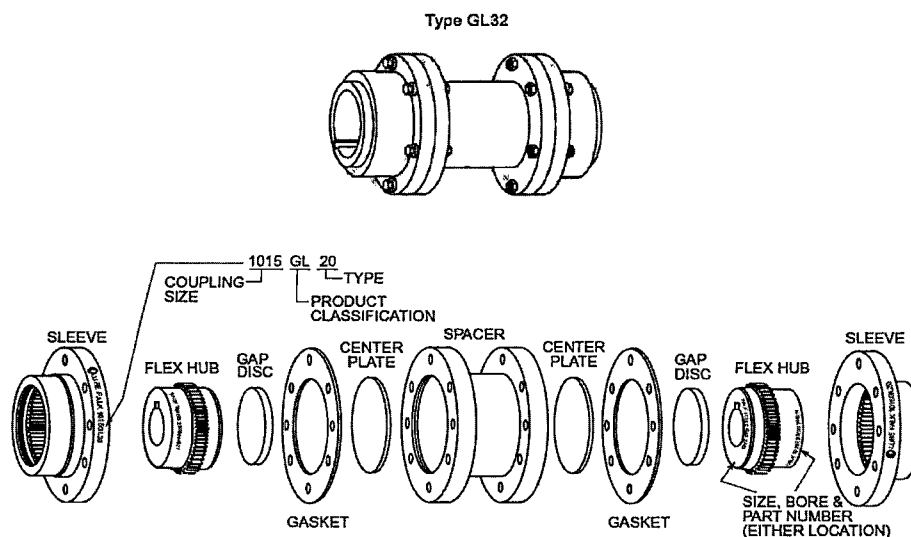


Parts in bad condition

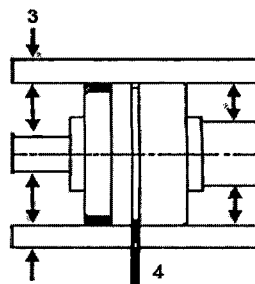


Location	Qty	Part	Part Description
101	1	2806B-00-0028G	PUMP CASING, 22 LSA-54 C 20
13-19	1	2903B-00-0028G	SUCTION LINER 24 LSA-54
13-21	1	2905B-00-0028G	HUB LINER
16-1	1	2807B-00-0065D	SUCTION PLATE
16-2	1	2906B-00-0065D	HUB PLATE
18-2	1	8350C-00-0FABS	PEDESTAL 9" SHAFT
230	1	4794C-00-0028G	IMP,LSA 24x 54,5MEL 54.00, 54.00C7.750
25-3	1	0962X-00-0000K	IMPELLER RELEASE RING ASSEMBLY - METRIC
35-1	2	1021B-00-0FABS	BEARING HOUSING STRAP 9" SHAFT 885D & 837D ASSY
512	1	2904B-00-0FABS	WEAR RING
524	1	9749P-94-0000K	KIT,SHAFT SLEEVE 2851B-00-0SFWS
59-47.03	1	8717P-55-HSTRP	M20 X 2.50 X 31.9 SWIVEL HOIST RING 50.8MM CLEARANCE DIA
680	1	2915B-00-0000A	GUARD,SFT SEAL ASSY, 9
909	1	0477B-01-ASCRP	ADJUSTING SCREW 4 7/16, 5 7/16, 6 7/16 & 9" C.B.A.
924	1	0477B-02-0P40C	ADJUSTING NUT 4 7/16, 5 7/16, 6 7/16, 9
940.70	1	9075P-33-01KSP	KEY (40 X 22 X 200) METRIC
99-24	1	8515D-33-0000A	SHAFT SEAL ASSY TYPE TB, 10.500IN
99-25	1	8508C-01-0000A	BEARING ASSEMBLY 9,2849B014150S CB,O,C,S
99-4	1	1950B-40-0000K	ADJUSTABLE LINER CONVERSION KIT
99-4	1	9728P-67-0000K	PUMP ASSEMBLY FASTENER KIT
99-9	1	9739P-51-0000K	PUMP ASSEMBLY GASKET KIT

Coupling Transmission (Rigid coupling)



RPM	Angular Misalignment 		Offset Misalignment 	
	Excellent	Acceptable	Excellent	Acceptable
≤ 900	1.0 $\frac{\mu\text{m}}{\text{mm}}$	1.5 $\frac{\mu\text{m}}{\text{mm}}$	100 μm	200 μm
* ≤ 1200	0.7 $\frac{\mu\text{m}}{\text{mm}}$	1.0 $\frac{\mu\text{m}}{\text{mm}}$	75 μm	150 μm
≤ 1800	0.5 $\frac{\mu\text{m}}{\text{mm}}$	0.7 $\frac{\mu\text{m}}{\text{mm}}$	50 μm	100 μm
≤ 3600	0.3 $\frac{\mu\text{m}}{\text{mm}}$	0.5 $\frac{\mu\text{m}}{\text{mm}}$	25 μm	50 μm





Specifications — Falk LTG

The values shown are typical and slight variations are permissible.

AMBIENT TEMPERATURE RANGE — -20°F (-29°C) to 250°F (121°C). Minimum pump = 20°F (-7°C).

MINIMUM BASE OIL VISCOSITY — 3300SSU (715cSt) @ 100°F (38°C).

THICKENER — Lithium soap/polymer.

CENTRIFUGE SEPARATION CHARACTERISTICS — ASTM #D4425-84 (Centrifuge Test) — K36 = 2/24 max., very high resistance to centrifuging.

NLGI GRADE (ASTM D-217) — 1/2

CONSISTENCY (ASTM D-217) — 60 stroke worked penetration value in the range of 315 to 360 measured @ 77°F (25°C).

MINIMUM DROPPING POINT — 350°F (177°C) minimum.

MINIMUM TIMKEN EP O.K. LOAD — 40 lbs. (18 kg).

ADDITIVES — Rust and oxidation inhibitors that do not corrode steel or swell or deteriorate synthetic seals.

Packaging

14 oz. (.4 Kg) CARTRIDGES — For use in standard industrial lubrication guns.

CASE LOTS — 10 – 14 oz. cartridges, 60 – 14 oz. cartridges.

35 lb. (16 Kg) PAILS — Ideal for larger size couplings or many smaller sizes.

120 lb. (54 Kg) KEG — For plants with many small couplings or large size couplings. Best for hand packing.

400 lb. DRUMS — For plants with a pressurized lubrication system.

General Purpose Grease

Bi-annual Lubrication — The following specifications and lubricants for general purpose grease apply to gear couplings that are lubricated bi-annually and operate within ambient temperatures of -30°F (-34°C) to 200°F (93°C). For temperatures beyond this range, consult the Factory. For normal service, use a NLGI #1 extreme pressure (EP) grease EXCEPT when the coupling speed is less than the minimum specified in Table 1, Page 5. At these lower speeds, use a NLGI #0 extreme pressure (EP) grease. When one or more gear couplings in an application require NLGI #0 grease, the same grease may be used in all of the couplings. DO NOT use cup grease.

If coupling leaks grease, is exposed to extreme temperatures, excessive moisture or experiences frequent reversals or axial movements; more frequent lubrication may be required.

Specifications — General Purpose Coupling Lubricants

The values shown are typical and slight variations are permissible.

DROPPING POINT — 300°F (149°C) or higher.

SEPARATION AND RESISTANCE — Low oil separation rate and high resistance to separation from centrifuging.

LIQUID CONSTITUENT — Possess good lubricating properties . . . equivalent to a high quality, well refined petroleum oil with EP additives.

INACTIVE — Must not corrode steel or cause swelling or deterioration of synthetic seals.

CLEAN — Free from foreign inclusions.

Oil Lubrication

EP oils may be a more effective lubricant than grease when the required coupling speed is one half of the minimum speed range of NLGI #1 grease listed in Table 1 (Minimum rpm ÷ 2). Oil lubricated couplings must be sealed to prevent leakage, i.e. keyways, etc. Couplings must be drained and refilled with new oil every six months for operating temperatures up to 160°F (71°C) and every three months for couplings operating at temperatures of 160°F (71°C) up to 200°F (93°C). For temperatures beyond this range, consult the Factory. The minimum operating temperature must not be lower than the pour point of the oil. The specified amount of grease listed in Table 1, Page 5, is in pounds and also applies to the volume of oil in pints.

Specifications

Type: Mild EP gear oil that meets AGMA Specifications 250.04.

Grade: AGMA #8EP (ISO VG 680).

Viscosity: 612-748 cSt @ 104°F (40°C).

Pour Point: 20°F (-7°C) Maximum.

Must not corrode steel or swell or deteriorate synthetic seals.

TYPE GL HORIZONTAL COUPLING INSTALLATION

Only standard mechanics tools, torque wrenches, dial indicator and feeler gauges are required to install gear couplings. Clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. DO NOT heat clearance fit hubs. Use a lubricant that meets the specifications on Page 2. Pack sleeve teeth with grease and lightly coat seals with grease BEFORE assembly. The required amount of grease is listed in Table 1, Page 5. Make certain flange fasteners are tightened to the required torque listed in Table 1, Page 5.

Interference Fit Hubs — Unless otherwise specified, gear couplings are furnished for an interference fit without set screws. Heat hubs to 275°F (135°C) using an oven, torch, induction heater or an oil bath. To prevent seal damage, DO NOT heat hubs beyond a maximum temperature of 400°F (205°C).

CAUTION: To prevent seal damage DO NOT heat hubs beyond a maximum temperature of 400°F (205°C).

When an oxy-acetylene or blow torch is used, use an excess acetylene mixture. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F (135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area.

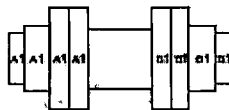
WARNING: If an oil bath is used, the oil must have a flash point of 350°F (177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials.

Maximize Performance & Life

The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically.

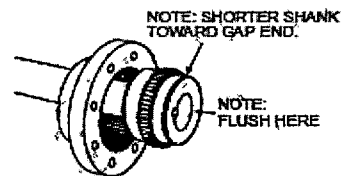
Balanced Couplings

The fasteners provided are matched sets and must not be mixed or substituted. Balanced couplings are match marked and must be assembled with mating match marks aligned. Component parts of assembly balanced couplings must not be replaced without re-balancing the complete assembly.



1 — Determine Coupling Assembly Number

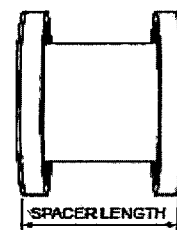
Measure flex hub dimension ZG or ZGL, as shown in drawings on Page 6. Compare the results with the values listed in Table 1 and compare coupling parts provided to the part identification drawings on Page 6 to determine if coupling is a GL32-1, GL32-2, or GL32-4. NOTE: GL32-4 couplings are provided with short tooth sleeves and gap discs.



2 — Mount Flanged Sleeve, Seal & Hubs

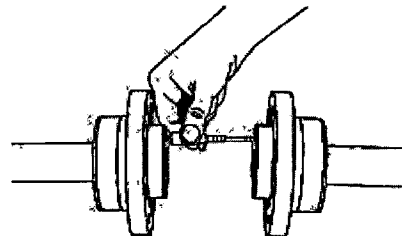
Place the flanged sleeves WITH seal rings on shafts BEFORE mounting hubs.

IMPORTANT: Mount hubs as shown above with SHORT shank, DIM. ZG or ZGL in Table 1 on Page 5, toward gap. Mount hubs so that each face is flush with the end of its shaft. Allow hubs to cool before proceeding. Seal keyways to prevent leakage. Insert set screws (if required) and tighten. Position equipment in approximate alignment with approximate hub gap.



3 — Determine Distance Between Hub Ends

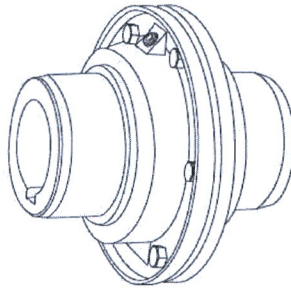
Accurately measure spacer length as shown above. To determine minimum hub gap dimension, add the spacer length measured, plus the minimum "X" dimension listed in Table 1 on Page 5. To determine maximum hub gap dimension, add the spacer length measured, plus the maximum "X" dimension listed in Table 1 on Page 5.



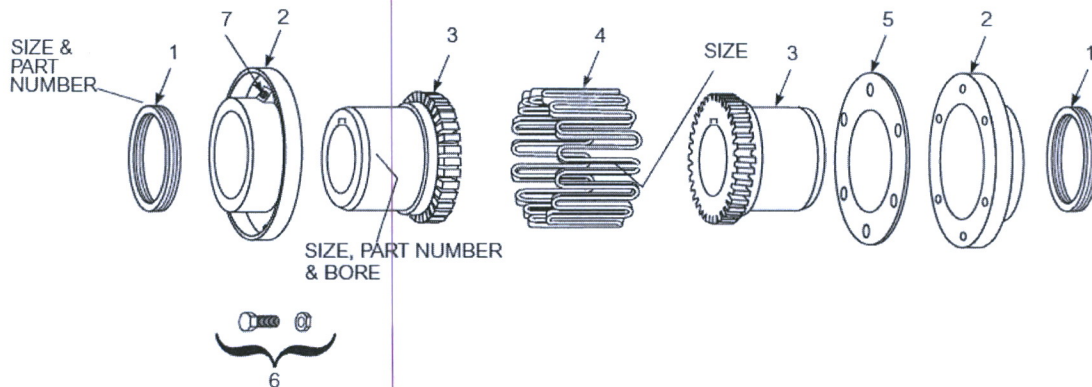
4 — Gap & Angular Alignment

Adjust gap to any value between minimum and maximum value calculated in Step 3. Axial movement must never exceed the minimum and maximum gap values. Temporarily secure the floating shaft or shafts at their required positions. Use an inside micrometer as shown above and at 90° intervals to measure the distance between hubs. The difference in minimum and maximum measurements should not exceed the installation ANGULAR limit specified in Table 1 on Page 5.

Coupling Transmission (Flexible coupling)



Type T20



Specifications — Falk LTG

The values shown are typical and slight variations are permissible.

AMBIENT TEMPERATURE RANGE — -20°F (-29°C) to 250°F (121°C). Min. Pump = 20° F (-7° C).

MINIMUM BASE OIL VISCOSITY — 3300SSU (715cST) @ 100°F (38°C).

THICKENER — Lithium & soap/polymer.

CENTRIFUGE SEPARATION CHARACTERISTICS — ASTM #D4425 (Centrifuge Test) — K36 = 2/24 max., very high resistance to centrifuging.

NLGI GRADE (ASTM D-217) — 1/2

CONSISTENCY (ASTM D-217) — 60 stroke worked penetration value in the range of 315 to 360 measured at 77°F (25°C)

MINIMUM DROPPING POINT — 350°F (177°C) minimum

MINIMUM TIMKEN O.K. LOAD — 40 lbs.

ADDITIVES — Rust and oxidation inhibitors that do not corrode steel or swell or deteriorate synthetic seals.

Packaging

14 oz (0,4 kg) CARTRIDGES — Individual or case lots of 10 or 30.

35 lb (16 kg) PAIL, 120 lb (54 kg) KEG & 400 lb (181 kg) DRUMS.

Installation Of Type T20 Steelflex Tapered Grid Couplings

Installation

Only standard mechanics tools, wrenches, a straight edge, and feeler gauges are required to install Falk Steelflex couplings. Clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. Coupling Sizes 1020T thru 1090T are generally furnished for CLEARANCE FIT with setscrew over the keyway. Sizes 1100T and larger are furnished for an INTERFERENCE FIT without a setscrew.

CLEARANCE FIT HUBS — Clean all parts using a non-flammable solvent. Check hubs, shafts, and keyways for burrs. Do not heat clearance fit hubs. Install keys, mount hubs with flange face flush with shaft ends or as otherwise specified and tighten setscrews.

INTERFERENCE FIT HUBS — Furnished without setscrews. Heat hubs to a maximum of 275°F (135°C) using an oven, torch, induction heater, or an oil bath. To prevent seal damage, DO NOT heat hubs beyond a maximum temperature of 400°F (205°C).

When an oxy-acetylene or blow torch is used, use an excess acetylene mixture. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F (135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area.

General Purpose Grease

Annual Lubrication — The following specifications and lubricants for general purpose grease apply to Falk Steelflex couplings that are lubricated annually and operate within ambient temperatures of 0°F to 150°F (-18°C to 66°C). For temperatures beyond this range, refer to Falk.

If a coupling leaks grease, is exposed to extreme temperatures, excessive moisture, or experiences frequent reversals, more frequent lubrication may be required.

Specifications — General Purpose Coupling Lubricants

The values shown are typical and slight variations are permissible.

DROPPING POINT — 300°F (149°C) or higher.

CONSISTENCY — NLGI No. 2 with 60 stroke worked penetration value in the range of 250 to 300.

SEPARATION AND RESISTANCE — Low oil separation rate and high resistance to separation from centrifuging.

LIQUID CONSTITUENT — Possess good lubricating properties equivalent to a high quality, well refined petroleum oil.

INACTIVE — Must not corrode steel or cause swelling or deterioration of synthetic seals.

CLEAN — Free from foreign inclusions.

WARNING: If an oil bath is used, the oil must have a flash point of 350°F (177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials.

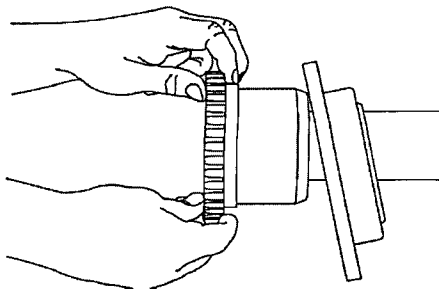
Heat hubs as instructed above. Mount hubs as quickly as possible with hub face flush with shaft end. Allow hubs to cool before proceeding. Insert setscrews (if required) and tighten.

Maximize Performance And Life

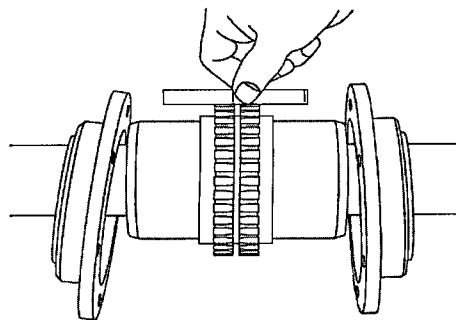
The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically.

Alignment is shown using spacer bar and straight edge. This practice has proven to be adequate for many industrial applications. However, for superior final alignment, the use of dial indicators (see Manual 458-834 for instructions), lasers, alignment computers, or graphical analysis is recommended.

1— Mount Covers, Seals & Hubs

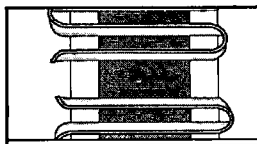


3 — Offset Alignment



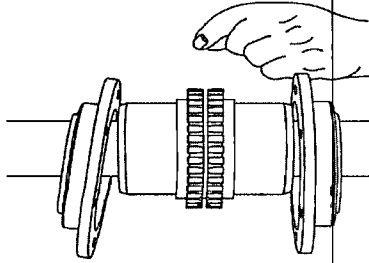
Align so that a straight edge rests squarely (or within the limits specified in Table 1) on both hubs as shown above and also at 90° intervals. Check with feelers. The clearance must not exceed the PARALLEL OFFSET installation limits specified in Table 1. Tighten all foundation bolts and repeat Steps 2 and 3. Realign coupling if necessary.

4 — InsertGrid



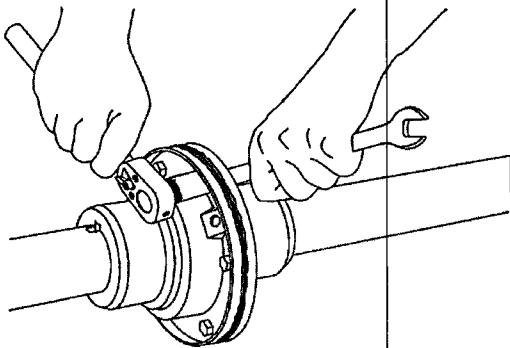
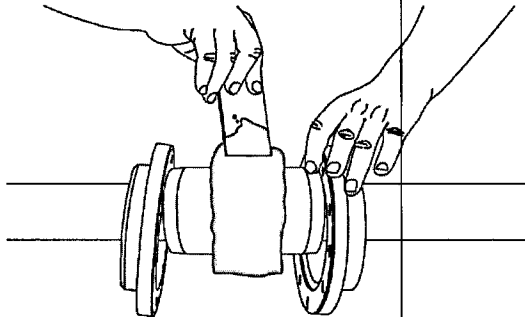
Lock out starting switch of prime mover. Clean all metal parts using a non-flammable solvent. Place seals into each cover half and lightly coat seals with grease. Place covers on shafts BEFORE mounting hubs. Heat interference fit hubs as previously instructed. Seal keyways to prevent leakage. Mount hubs on their respective shafts so the hub face is flush with the end of its shaft unless otherwise indicated. Tighten setscrews when furnished.

2 — Gap & Angular Alignment

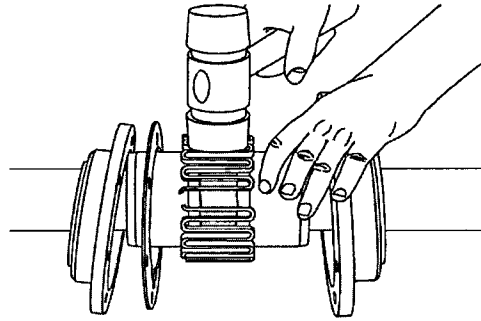


Use a spacer bar equal in thickness to the gap specified in Table 1, Page 5. Insert bar as shown below left, to same depth at 90° intervals and measure clearance between bar and hub face with feelers. The difference in minimum and maximum measurements must not exceed the ANGULAR installation limits specified in Table 1.

5 — Pack With Grease & Assemble Covers



Pack the spaces between and around the grid with grease.



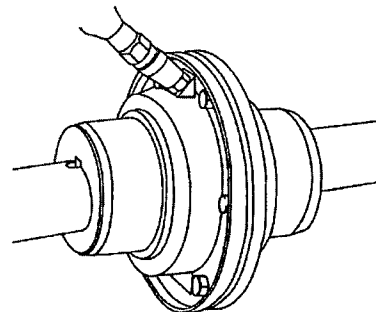
Insert gasket thru the gap and hang it on either hub. Pack gap and grooves with specified lubricant before inserting grid. When grids are furnished in two or more segments, install them so that all cut ends extend in the same direction (as detailed in the exploded view picture above); this will assure correct grid contact with non-rotating pin in cover halves. Spread the grid slightly to pass over the coupling teeth and seat with a soft mallet.

Annual Maintenance

For extreme or unusual operating conditions, check coupling more frequently.

1. Check alignment per steps on Page 3. If the maximum operating misalignment limits are exceeded, realign the coupling to the recommended installation limits. See Table 1 for installation and operating alignment limits.
2. Check tightening torques of all fasteners.
3. Inspect seal ring and gasket to determine if replacement is required. If leaking grease, replace.
4. When connected equipment is serviced, disassemble the coupling and inspect for wear. Replace worn parts. Clean grease from coupling and repack with new grease. Install coupling using new gasket as instructed in this manual.

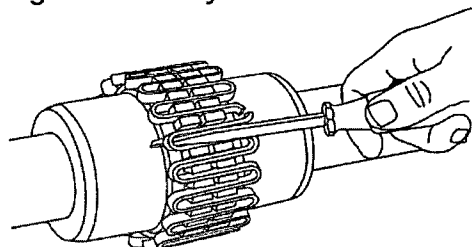
Periodic Lubrication



Pack the spaces between and around the grid with as much lubricant as possible and wipe off excess flush with top of grid. Make certain lube plugs are removed to ease in cover assembly. Slide cover halves with seals onto hubs and position with lube holes 180° apart (90° apart for Sizes 1150 thru 1170). Line up cover and gasket bolt holes and secure with fasteners; tighten to torque specified in Table 1. **CAUTION:** Make certain lube plugs are installed before operating.

The required frequency of lubrication is directly related to the type of lubricant chosen, and the operating conditions. Steelflex couplings lubricated with general purpose coupling greases, should be relubed annually. The use of Falk Long Term Grease (LTG) will allow relube intervals to be extended to beyond five years. When relubing, remove both lube plugs and insert lube fitting. Fill with recommended lubricant until an excess appears at the opposite hole. **CAUTION:** Make certain all plugs have been inserted after lubricating.

Coupling Disassembly & Grid Removal



Whenever it is necessary to disconnect the coupling, remove the cover halves and grid. A round rod or screwdriver that will conveniently fit into the open loop ends of the grid is required. Begin at the open end of the grid section and insert the rod or screwdriver into the loop ends. Use the teeth adjacent to each loop as a fulcrum and pry the grid out radially in even, gradual stages, proceeding alternately from side to side.

Type T Coupling Installation & Alignment Data

Maximum life and minimum maintenance for the coupling and connected machinery will result if couplings are accurately aligned. Coupling life expectancy between initial alignment and maximum operating limits is a function of load, speed and lubrication. Maximum operating values listed in Table 1 are based on cataloged allowable rpm.

Values listed are based upon the use of the gaps listed, standard coupling components, standard assemblies, and cataloged allowable speeds.

Values may be combined for an installation or operating condition.

Example: 1060T max. operating misalignment is .016" parallel plus .018" angular.

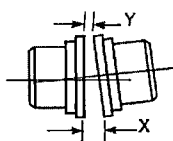
NOTE: For applications requiring greater misalignment, refer application details to the Factory.

Angular misalignment is dimension X minus Y as illustrated below.

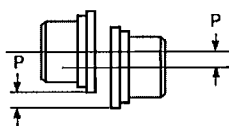
Parallel misalignment is distance P between the hub center lines as illustrated below.

End float (with zero angular and parallel misalignment) is the axial movement of the hubs(s) within the cover(s) measured from "O" gap.

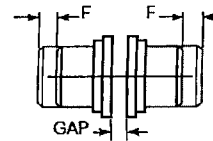
ANGULAR MISALIGNMENT



PARALLEL OFFSET MISALIGNMENT



END FLOAT



Be sure the keys shafts are 180 degrees (opposite) one from another to avoid shaft unbalanced

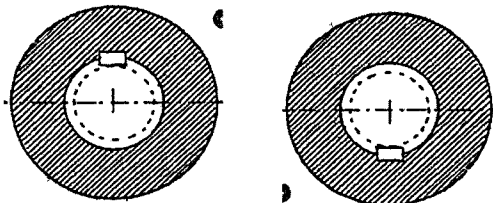


TABLE 1 — Misalignment & End Float

SIZE	Installation Limits						Operating Limits						Cover Fastener Tightening Torque Values		Allow Speed (rpm)	Lube Wt	
	Parallel Offset-P		Angular (x-y)		Hub Gap ±10%		Parallel Offset-P		Angular (x-y)		End Float Physical Limit (Min) 2xF						
	Max Inch	Max mm	Max Inch	Max mm	Inch	mm	Max Inch	Max mm	Max Inch	Max mm	Inch	mm	(lb-In)	(Nm)		lb	kg
1020T	.006	0,15	.003	0,08	.125	3	.012	0,30	.010	0,25	.186	4,72	100	11,3	6000	.06	0,03
1030T	.006	0,15	.003	0,08	.125	3	.012	0,30	.012	0,30	.186	4,72	100	11,3	6000	.09	0,04
1040T	.006	0,15	.003	0,08	.125	3	.012	0,30	.013	0,33	.186	4,72	100	11,3	6000	.12	0,05
1050T	.008	0,20	.004	0,10	.125	3	.016	0,41	.016	0,41	.186	4,72	200	23,6	6000	.15	0,07
1060T	.008	0,20	.005	0,13	.125	3	.016	0,41	.018	0,46	.220	5,59	200	22,6	6000	.19	0,09
1070T	.008	0,20	.005	0,13	.125	3	.016	0,41	.020	0,51	.220	5,59	200	22,6	5500	.25	0,11
1080T	.008	0,20	.006	0,15	.125	3	.016	0,41	.024	0,61	.282	7,16	200	22,6	4750	.38	0,17
1090T	.008	0,20	.007	0,18	.125	3	.016	0,41	.028	0,71	.282	7,16	200	22,6	4000	.56	0,25
1100T	.010	0,25	.008	0,20	.188	5	.020	0,51	.033	0,84	.408	10,36	260	29,4	3250	.94	0,43
1110T	.010	0,25	.009	0,23	.188	5	.020	0,51	.036	0,91	.408	10,36	260	29,4	3000	1.1	0,51
1120T	.011	0,28	.010	0,25	.250	6	.022	0,56	.040	1,02	.546	13,87	260	29,4	2700	1.6	0,74
1130T	.011	0,28	.012	0,30	.250	6	.022	0,56	.047	1,19	.548	13,92	650	73,4	2400	2.0	0,91
1140T	.011	0,28	.013	0,33	.250	6	.022	0,56	.053	1,35	.568	14,43	650	73,4	2200	2.5	1,14
1150T	.012	0,30	.016	0,41	.250	6	.024	0,61	.062	1,57	.620	15,75	650	146	2000	4.2	1,91
1160T	.012	0,30	.018	0,46	.250	6	.024	0,61	.070	1,78	.630	16,00	1300	146	1750	6.2	2,81
1170T	.012	0,30	.020	0,51	.250	6	.024	0,61	.079	2,01	.630	16,00	1300	146	1600	7.7	3,49

Spares to replace		
Item number	Description	Qty
5010084	SEAL KIT,1060GL32-1 CPLG	1
5010090	SEAL KIT,1140T20 CPLG,W/GASKET	1
5287774	Copal,olg,18KG	1
5007998	Gland packing,10.50/12.50x1.00	1

<i>Supervisor</i>	
<i>Signature</i>	
<i>Dated</i>	